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ON THE INTEGRALS OF UNBOUNDED FUNCTIONS WITH APPLICATIONS

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Rezumat. *Subiectul in aceasta lucrare este orientat pe studiul posibilei evaluări a integralelor funcţiilor reale nemărginite cu variabile reale. Autorul introduce noţiunea de integrală Riemann generalizată a funcţiilor nemărginite, unde diviziunile finite ale domeniului de definiţie pentru integrala Riemann sunt substituite de diviziuni numărabile şi unde sumele finite integrale pentru integrala Riemann sunt substituite de serii integrale. Interferenta dintre noţiunile de integrală Riemann generalizată a funcţiilor nemărginite şi integrala Lebesgue a funcţiilor nemărginite, analizată în aceasta lucrare, este benefică pentru ambele noţiuni.*

Abstract. *The subject in this paper is focused on the study of a possible evaluation of real unbounded function integrals with real variable. The author introduces the notion of the generalized Riemann integral of unbounded functions where the finite divisions of definition domain for Riemann integral are substituted by the numerable divisions and where the integral finite sums for Riemann integral are substituted by the integral series. The interference between the notions of unbounded functions generalized Riemann integral and of unbounded functions Lebesgue integral, analyzed in this paper, is beneficial for both notions.*

Keywords: Unbounded functions, Integrable functions, Integral series, Mechanical modelling

1. Introduction notions

In this paper we are limited to a function of a single variable $f(x)$, defined on the interval $[a,b]$, with the values in the real numbers set R.

Definition 1

A point $x_0 \in [a,b]$ is a singular (unbounded) point of the function $f \geq 0$ if there exist a sequence $\{x_n\}_{n\in N} \subset [a,b]$, $x_n \to x_0$, such that $f(x_n) \to \infty$.

Definition 2

Let us consider a set $A \subset R$ and $x_0 \in R$. The point x_0 is named an accumulation point of the set A if there exist a sequence $\{x_n\}_{n\in N} \subset A$, $x_n \to x_0$.

Definition 3

The set $A' \subset R$ of the accumulation points of the set $A \subset R$ is named the derivative set of the set A or that $A' \subset R$ is a derivate of the set $A \subset R$.

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